
NASA Expendable Launch Vehicle (ELV) Payload Safety Program
Training for Safety Engineers

Course Goals:

- Introduce the NASA ELV Payload Safety Program, NPR 8715.7, NASA-STD-8719.2X an the Payload Safety Review Process/Requirements

- Provide Safety Engineers with an understanding of what is necessary to successfully complete the NASA ELV Payload Safety Review Process as well as their role as a participating member of the Payload Safety Working Group (PSWG).

Course Objective:

- Provide Safety Engineers with an understanding of what is necessary to successfully complete the NASA ELV Payload Safety Review Process as well as their role as a participating member of the Payload Safety Working Group (PSWG).

Course Overview

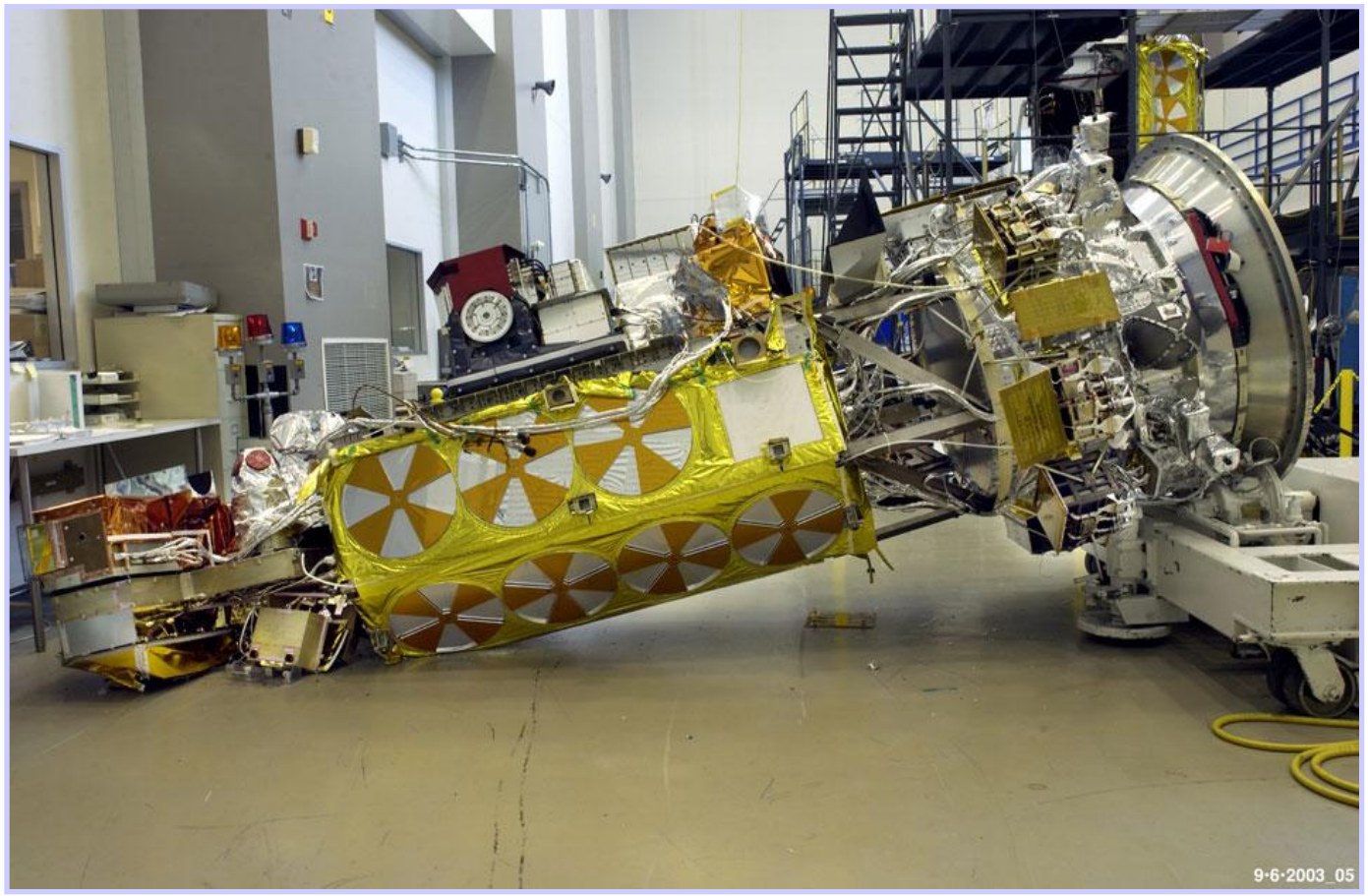
- Background/Introduction
- Program Overview
- Process Overview
- Payload Safety Engineering
- Program Implementation
- Typical flow and data package requirements
- Safety Introduction Briefing
- Safety Review I, II and III
- Waiver Process, Hazard Reports, etc.
- Lessons Learned

ELV Payload Safety Program

- Purpose: To improve structure and processes for ensuring NASA ELV payloads are designed, transported, processed, tested, integrated to launch vehicle and launched safely in support of mission success.
- An element of OSMA
- Funded by OSMA via PPBE
- Added a Safety Manager and an Agency Team to assist when needed and provide oversight
- NPR 8715.7 (May 2008)
- Working with Air Force Ranges to tailor AFSPCMAN 91-710 for use by NASA ELV payload projects

Background

Why was the ELV Payload Safety Program needed?



Background

Why was the ELV Payload Safety Program needed?

- NASA Payloads:
  - Often incorporate hazards which pose significant risk to life and property
  - Require coordination of efforts among diverse groups with varying responsibilities and authorities
- NASA ELV Payload Safety Program was established to:
  - Provide assistance to payload projects in achieving safety design objectives and obtaining the necessary safety approvals to assure that NASA safety policy is satisfied throughout the mission

Background

When was the ELV Payload Safety Program started?

- NPR 8715.7 *Expendable Launch Vehicle Payload Safety Program* replaced outdated NASA-STD-8719.8 *Expendable Launch Vehicle Payload Safety Review Process Standard* in May 2008
  - Similar PSWG safety review approach
  - Includes Air Force Range Safety as PSWG member
  - Follows NPR 7120.5 project schedule timeline
  - Provides more structure to the safety review process
    - Roles and Responsibilities defined
    - Deliverables better defined with a schedule
  - Expands beyond "pre-launch processing focus" to include design, testing, integration, launch and recovery
  - Helps ensure a consistent level of safety regardless of who is the project manager

Applicability

- NPR 8715.7 Applies to:
  - Unmanned orbital and unmanned deep space payloads managed, launched, or developed in a joint venture with NASA
  - The payload's design, fabrication, testing, vehicle integration, launch processing, launch, planned recovery, etc.

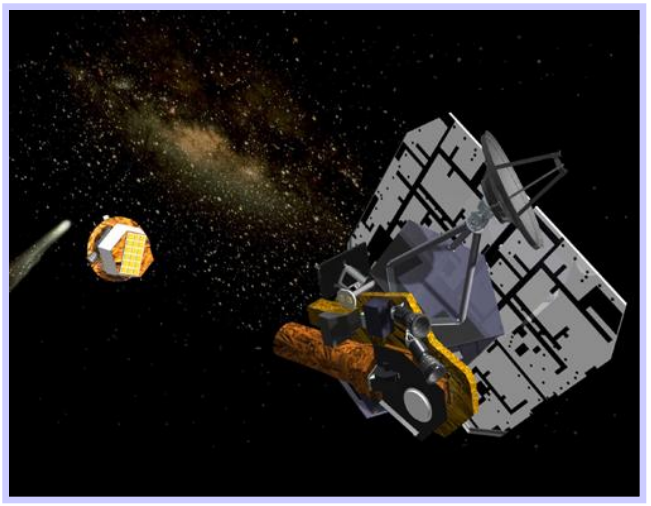
Applicability

NPR 8715.7 Does NOT Apply to:

- Payloads that interface with a manned launch vehicle or spacecraft
- Payloads that will fly on suborbital launch vehicles
- Non-NASA payloads launched from Wallops Flight Facility where NASA is just providing range services
- In-flight spacecraft operational safety or mission success

Program Overview

Program Overview



- Safeguard people/resources from hazards by removal or reducing the risk. Accomplished by:
  - Establishment & maintenance of technical & procedural safety requirements
  - Coordination with U.S./foreign entities
  - Incorporation of safety requirements into the payload's:
    - overall requirements
    - contracts for related procurements
    - cooperative or grant agreements
  - An independent safety review & approval process
- Ensure adherence to safety requirements providing equivalent level of safety regardless of processing location

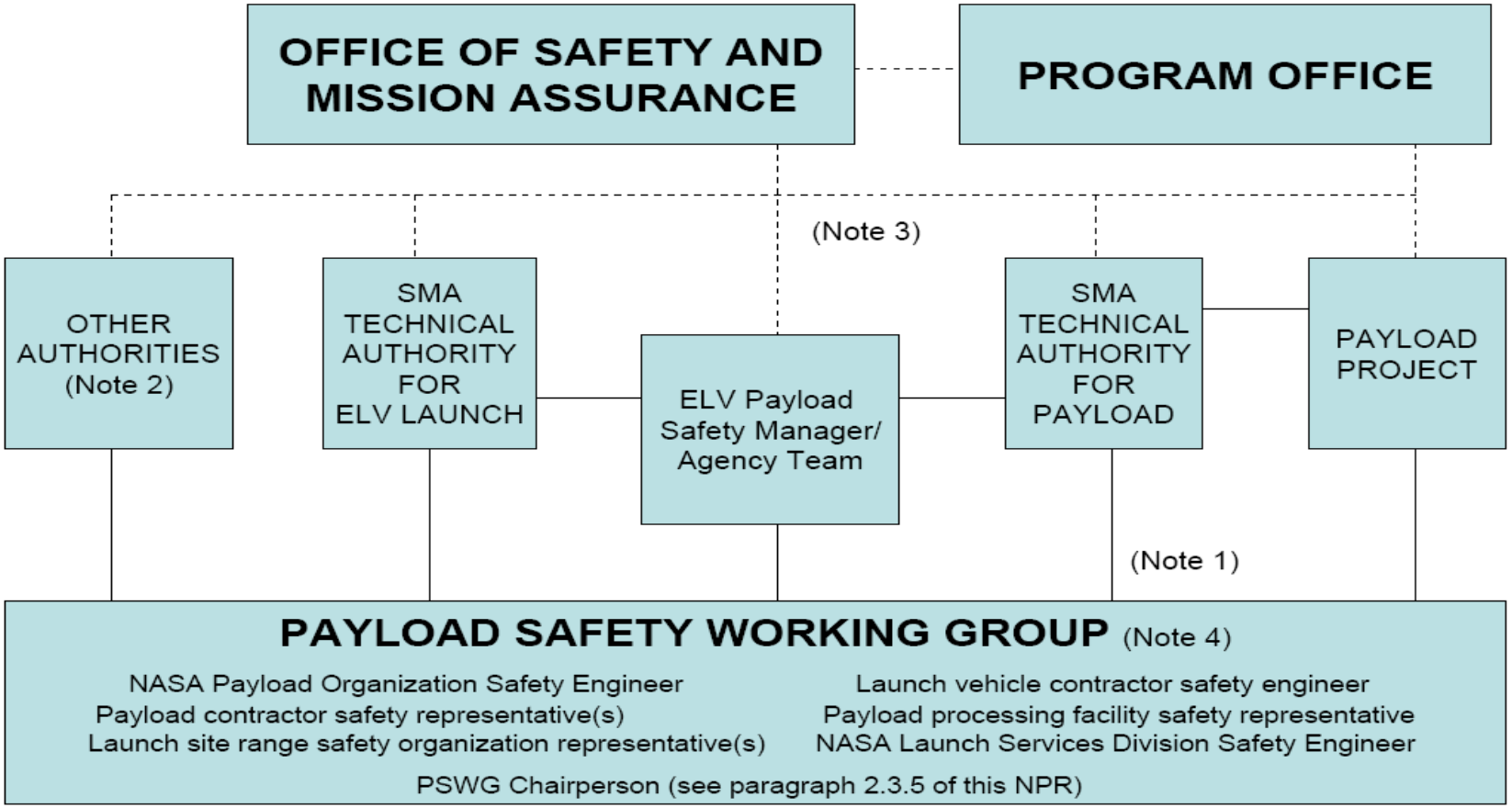
Roles & Responsibilities

- Chief, Safety and Mission Assurance
  - Oversee and provide funding
  - Approve agency level policy and requirements
  - Resolve any conflicts that come to the agency level during the safety process
- Each SMA Technical Authority
  - Payload Center
  - Launch processing Center, etc.
  - Responsible for approving tailoring
  - Concur son waivers (non-compliances)
- NASA ELV Payload Safety Manager
  - Serves as the Agency focal point for matters of ELV payload safety
  - Develops & maintains Agency-level policy & requirements
  - Maintains the safety review & approval process
  - Provides input and guidance to NASA officials on contracts, grants, & cooperative agreements with internal and external entities
  - Reports to the NASA HQ OSMA on agency level safety concerns

Roles & Responsibilities

- ELV Payload Safety Agency Team
  - An element of OSMA that functions to provide Agency-wide perspective and insight in support of the SMA Technical Authority
  - Independently assess projects to assure that policy and requirements of this program are consistently implemented throughout the Agency
  - Assure consistent interpretation of requirements & provide guidance on implementation
- Each Center Director responsible for a Payload, Payload Processing Facility, or Launch Site (or designee)
  - Establish center-level processes and requirements needed
  - Support safety assessments of ELV payload activities
  - Ensure responsible parties complete training on safety requirements, processes and related activities
  - Ensure GSE (institutional resources) provided to the project in in compliance
- Each Center SMA Director responsible for a Payload, Payload Processing Facility, or Launch Site (or designee)
  - Ensure implementation of NPR 8715.7 for each project
  - Provide each payload project with any safety expertise necessary
  - Ensure processes exist and assessments are conducted to ensure compliance with NPR 8715.7
- NASA Contract, Grant, Cooperative Agreement, or Other Agreement Officers
  - Ensure all applicable S&MA requirements are incorporated into the contracts and agreements for each payload

ELV Payload
Safety Review Process Interfaces



Note 1: Solid lines indicate communications that take place during a nominal safety review process. The lack of lines in this figure is not to imply that communications among the various authorities can not take place.

Note 2: Other Authorities typically include the Air Force (for launches from an Air Force Range) and may include other government agencies, international partners, or commercial payload processing facilities where applicable.

Note 3: Dashed lines indicate lines of communication that may be exercised when the safety review process identifies an issue that requires a Headquarters-level decision.

Note 4: The PSWG is the primary payload safety review interface for the project, where all initial submittals and safety concerns or issues start.

NASA ELV Payload Safety Manager

- Serves as the Agency focal point for matters of ELV payload safety
- Develops & maintains Agency-level policy & requirements as well as the safety review & approval process
- Provides input and guidance to NASA officials on contracts, grants, & cooperative agreements with internal and external entities
- Reports to the NASA HQ OSMA on safety concerns requiring an Agency-level decision
- Participate as an element of the NASA HQ SMA Audits, Reviews, and Assessments
- Opens & enhances communications with U.S. and foreign entities and document partnerships, joint activities, and special arrangements

ELV Payload Safety Agency Team

- An element of OSMA that functions to provide Agency-wide perspective and insight in support of the SMA Technical Authority
- Independently assess projects to assure that policy and requirements of this program are consistently implemented throughout the Agency
- Assure identification of safety concerns for each project and any applicability to other payloads
- Coordinate any safety concerns with the project's PSWG as early as possible
- Provide guidance to the Chief, Safety and Mission Assurance, and the SMA Technical Authorities, including issues requiring an Agency-level decision
- Assure consistent interpretation of requirements & provide guidance on implementation

Payload Project Manager

- Responsible for Project Safety
- Ensure resources are allocated to satisfy safety requirements
- Ensure that the project technical development, design, test and review processes incorporate system safety engineering
- Ensure that the design and operations of flight hardware, software, and associated GSE provides for safety through the use of approved design, analysis, and verification techniques
- Ensure the project's timeline complies with NPR 7120.5 and this safety review process
- Establish and implement any project-level processes and requirements needed to satisfy safety requirements and complete safety review and approval process
- Ensure that the project's tailored requirements document is implemented for its payload and associated GSE or a waiver is obtained
- Ensure spacecraft contractor oversight is defined, performed, and documented to enable safe integration, testing, and processing of the payload and prevention the transfer of unanticipated hazards
- Coordinate with their local SMA for assignment of Payload Organization Safety Engineer

Payload Project Manager

- Ensure the Payload Safety Introduction Briefing is coordinated and scheduled early in Phase B (as defined in NPR 7120.5)
- Notify the NASA ELV Payload Safety Manager of the new project and provide contact information for the appointed Payload Organization Safety Engineer
- Coordinate with the NASA ELV Payload Safety Manager to ensure that the project's PSWG is established and functions as required by the NPR
- Ensure all project personnel involved receive training on the process, understand their roles and responsibilities, & have experience commensurate with project complexity
- Ensure that the project plans, fully participates, and supports the safety review and approval process
- Ensure safety status & any safety concerns associated with each subsystem and integrated system are presented at appropriate project reviews
- Approve all safety deliverables prior to submittal to the PSWG
- Obtain all safety approvals & safety readiness products needed for the project management requirements of NPR 7120.5 and accomplish mission processing.

Payload Project Manager

- Obtain all safety approvals & safety readiness products needed for the project management requirements of NPR 7120.5 and accomplish mission processing.
- Ensure the implementation of all safety plans & procedures required by this NPR
- Ensure that the status of any open items in the Safety Action Tracking Log or any payload safety issues that could impact launch schedule are briefed during safety and project reviews
- Ensure the design process incorporates system safety engineering activities integral to identifying hazards, developing solutions to mitigate or eliminate the hazards, and verifying the implementation of these solutions
- Ensure that the PSWG Chairperson is notified of any mishaps or close calls that take place during launch area payload processing & ground operations
- Coordinate with the NASA ELV Payload Safety Manager and/or KSC SMA Launch Services Division Safety to ensure that the PSWG includes:
  - NASA Payload Organization Safety Engineer
  - Payload contractor safety representative(s)
  - Launch site range safety organization representative(s)
  - Launch vehicle contractor safety engineer
  - Payload processing facility safety representative
  - NASA KSC SMA Launch Services Division Safety Engineer (Chair)

Payload Project Safety Engineer

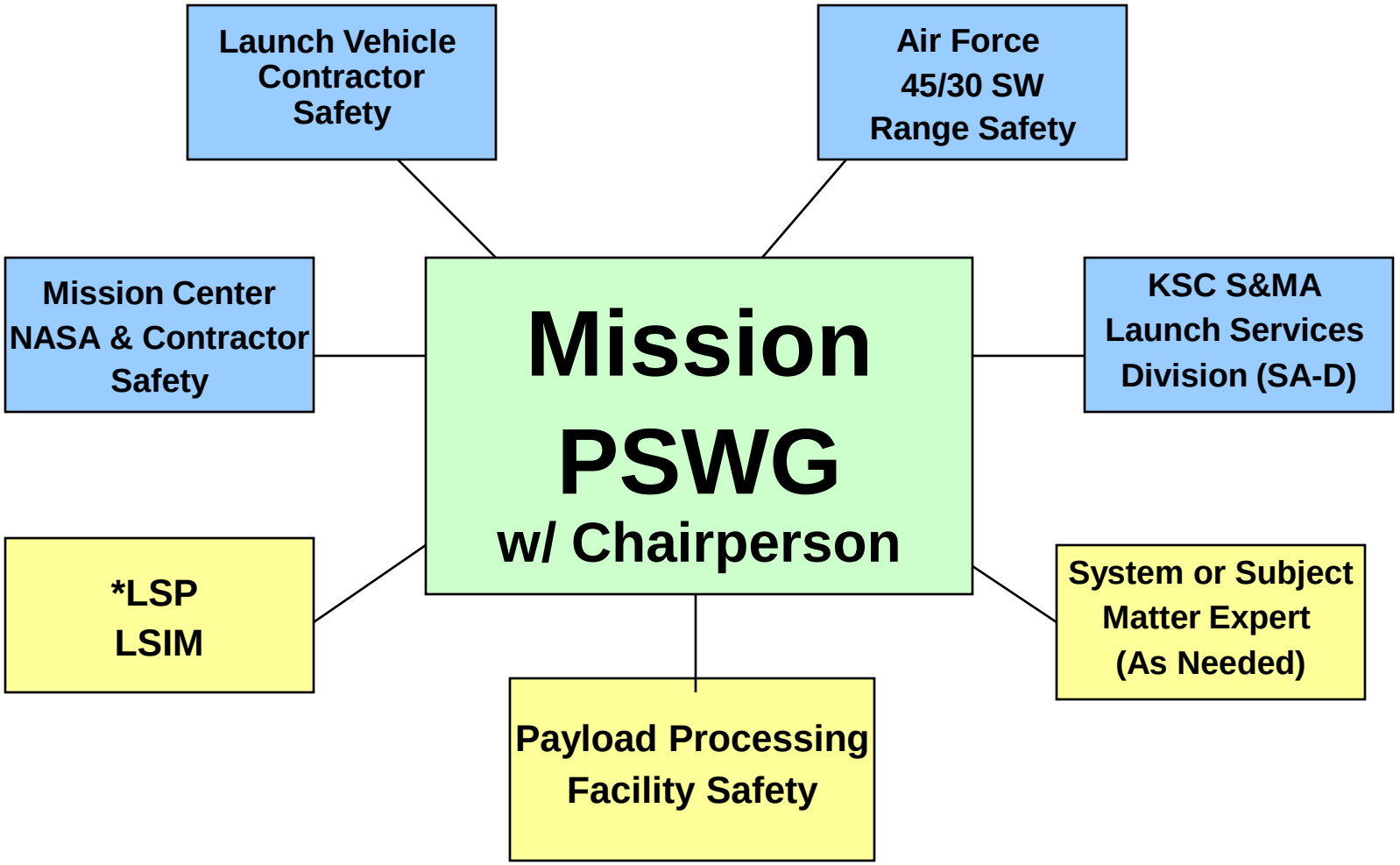
- Acts as the payload organization's primary member of the PSWG
- Ensures the preparation and submittal of all deliverables
- Keep the Payload Project Manager informed of mission safety status
- Ensures that technical operating procedures are submitted for review and approval in accordance with the safety requirements of the specific operating location
- Ensure that a Safety Verification Tracking Log (SVTL) is established, maintained and made electronically available
- Ensure that a Safety Action Tracking Log is established and maintained for the project to track closure of safety actions
- In coordination with the PSWG Chairperson, establish and maintain an integrated schedule of PWSG activities and all relevant project milestones

Payload Safety Working Group (PSWG)

- PSWG Chairperson - NASA KSC SMA Launch Services Division Safety Engineer.
- Co-Chairperson may be appointed for any mission
- Composition of the PSWG & member participation may vary based on:
  - project activities
  - technical issues
  - multi-Center project involvement
  - operational requirements e.g. selection of launch vehicle or processing facility

Note: PSWG is always the starting point for resolving safety issues, then Agency Team, SMA TAs and if necessary Chief OSMA.

Payload Safety Working Group Membership



*Invited participant

Note: NASA Launch site safety organization will most likely chair

Membership Roles & Responsibilities

- Each Member shall:
  - Participate in the safety review and approval process
  - Ensure compliance with all safety requirements for their area of responsibility and authority
  - Review and provide comments to the project on deliverables within 30 days after submittal
  - Assess and concur on tailoring and any waiver that is within their scope of responsibility
  - Coordinate with the PSWG to resolve payload safety concerns and if needed, with the Agency Team
  - Ensure that payload, facility, and payload/launch vehicle integration issues are disseminated to their organization and to other PSWG members
  - Participate in PSWG activities
  - Assess and concur on deliverables (plans, tailored requirements, hazard reports, Certificate of Safety Compliance, etc.)

PSWG Chairperson

- Manage & administer PSWG activities (meetings, schedule, etc)
- Ensure PSWG member participation
- Provide official PSWG signature (indicating concurrence from all PSWG members) for all deliverables and correspondence
- Ensure deliverables are available for review
- Ensure that the PSWG, Agency Team, & LSP representatives are invited to PSWG activities
- Ensure all comments to deliverables are organized and submitted to the project ≤ 35 days after submittal
- Ensure PSWG activities are documented - e.g. notices, action items, decisions, etc.
- Ensure distribution of final minutes

PSWG Chairperson (cont)

- Ensure PSWG participation by appropriate members at payload/launch vehicle integration working group meetings
- Schedule and conduct PSWG meetings concurrently with major project reviews and as required to meet the safety milestones of this program
- Ensure notification of the project safety schedule and changes
- Ensure the Agency Team is informed of safety issues that may impede the safety review process
- Ensure that all safety related documents are accessible to the PSWG members, Agency Team, and other subject matter experts or technical authorities
- If the PSWG cannot reach consensus, coordinate with the NASA ELV Payload Safety Manager to establish a resolution approach
- Coordinate with the PSWG and the project to ensure implementation of recommendations, interpretations, and resolutions of any safety concern provided by the Agency Team

ELV Payload Safety Program Website

http://kscsma.ksc.nasa.gov/ELVPayloadSafety/default.html

- Has contact information (GSFC SMA, KSC SMA, JPL)
- References under “Requirements Documents” button
- Separate button for forms under “ELV Payload Safety Documents”
  - Hazard Reports, Waiver forms, etc.

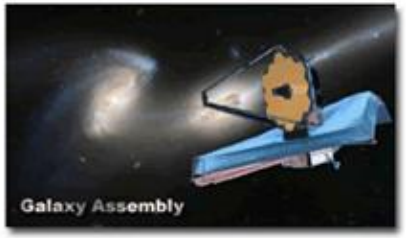
National Aeronautics and Space Administration

Safety and Mission Assurance Directorate

- NASA Home
- NASA HQ OSMA
- KSC SMA
- GSFC SMA
- JPL Home
- Agency Team
- Reference Documents
- ELV Payload Safety Forms
- Launch Services Program (LSP)
- KSC LSP Portal
- NASA Engineering and Safety Center (NESC)
- NASA Safety Center (NSC)
- ELV Payload Development Schedule
- PBMA

ELV Payload Safety Program

+ Current Missions | + Future Missions | + Launched



NASA Expendable Launch Vehicle (ELV) Payloads

NASA ELV payloads often incorporate hazards which can pose significant risk to life and property. **NASA ELV** payload missions require the coordination of efforts among a diverse group of participants who have varying responsibilities and authorities. These missions can present unique challenges to the payload safety assurance process, which often involves numerous organizations internal and external to the Agency. The **Office of Safety and Mission Assurance** has established the **NASA ELV Payload Safety Program** to assist ELV payload projects in obtaining the necessary safety approvals to assure that NASA safety policy is satisfied for all ELV payload missions.

ELV Payload Safety Program Video

NPR 8715.7 Presentation

The NPR Roadshow - Project Managers

Depending on your computer system these links may take a few seconds to open.

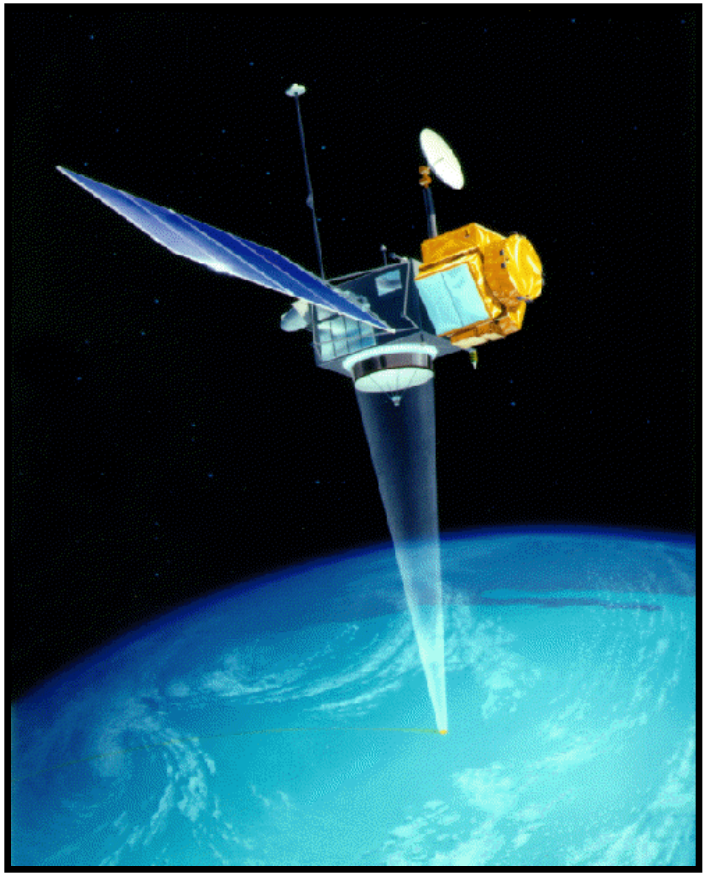
Questions

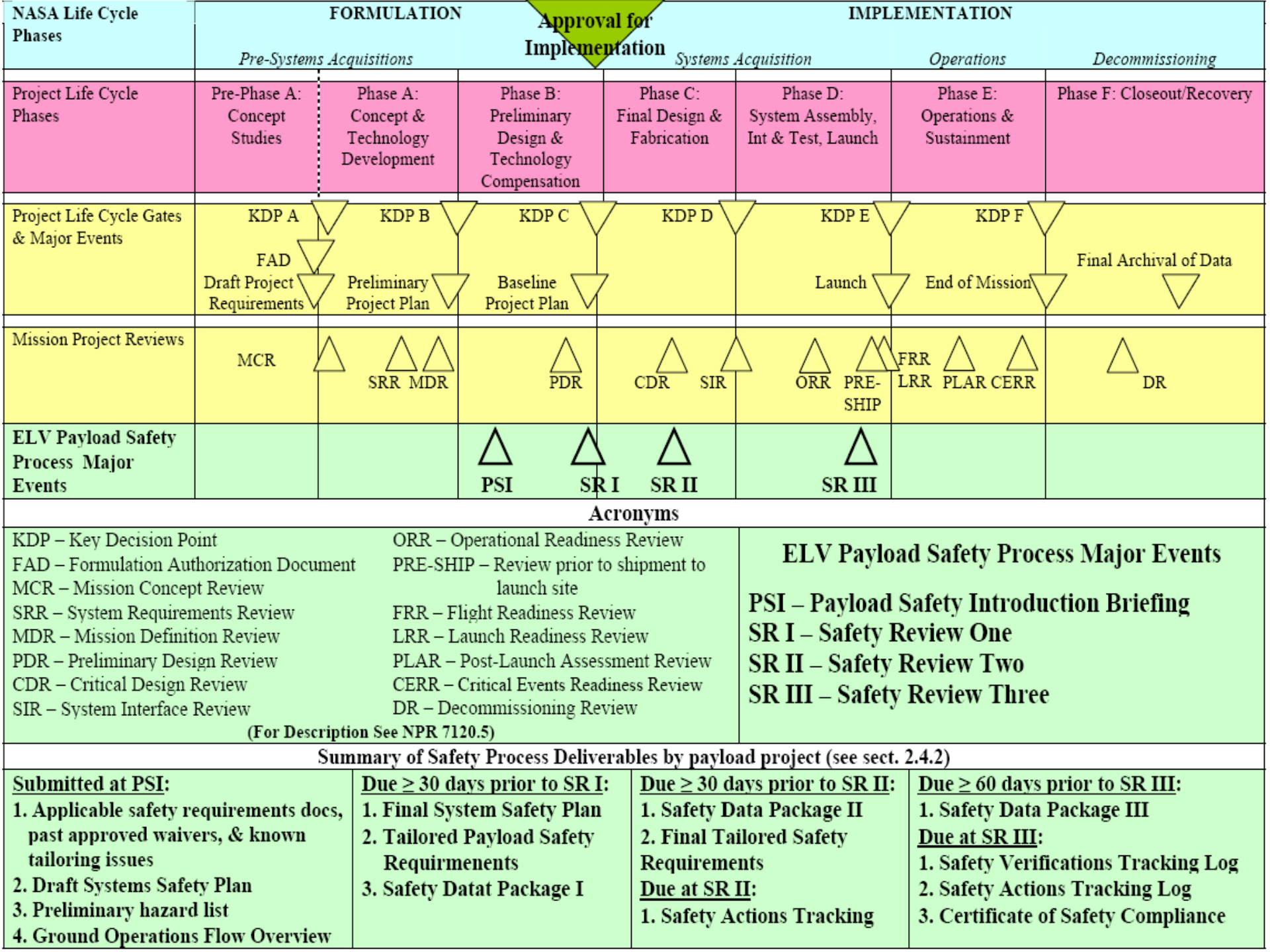
1. Why was the NASA ELV Payload Safety Program established?
   a. Ensure safety of those working on the payload
   b. Ensure the safety of the payload
   c. Ensure the safety of the facility
   d. All of the above
2. True or False: the PSWG chairperson ensures PSWG member participation?
3. True or False: A function of the NASA ELV Payload Safety Program Agency Team is to independently assess projects?

Process Overview

Safety Review and Approval Process

- Assure the appropriate representation and involvement of all organizations that support the mission
- Identify and resolve any safety concerns as early as feasible during the project timeline
- Assure that the project obtains the formal approval of all required approving authorities for the mission





Acronyms

KDP – Key Decision Point
FAD – Formulation Authorization Document
MCR – Mission Concept Review
SRR – System Requirements Review
MDR – Mission Definition Review
PDR – Preliminary Design Review
CDR – Critical Design Review
SIR – System Interface Review
ORR – Operational Readiness Review
PRE-SHIP – Review prior to shipment to launch site
FRR – Flight Readiness Review
LRR – Launch Readiness Review
PLAR – Post-Launch Assessment Review
CERR – Critical Events Readiness Review
DR – Decommissioning Review

(For Description See NPR 7120.5)

ELV Payload Safety Process Major Events

PSI – Payload Safety Introduction Briefing
SR I – Safety Review One
SR II – Safety Review Two
SR III – Safety Review Three

Summary of Safety Process Deliverables by payload project (see sect. 2.4.2)

Submitted at PSI:
1. Applicable safety requirements docs, past approved waivers, & known tailoring issues
2. Draft Systems Safety Plan
3. Preliminary hazard list
4. Ground Operations Flow Overview

Due ≥ 30 days prior to SR I:
1. Final System Safety Plan
2. Tailored Payload Safety Requirmenents
3. Safety Datat Package I

Due ≥ 30 days prior to SR II:
1. Safety Data Package II
2. Final Tailored Safety Requirements

Due at SR II:
1. Safety Actions Tracking

Due ≥ 60 days prior to SR III:
1. Safety Data Package III

Due at SR III:
1. Safety Verifications Tracking Log
2. Safety Actions Tracking Log
3. Certificate of Safety Compliance

Schedule

- Life Cycle Phases
  - Phases
  - Gates and Major Events
  - Mission Project Reviews
  - ELV Payload Safety Process major Events
- Acronyms listed
- Payload safety Process deliverables

Flow of Activities and Deliverables

- NPR 7120.5 – The safety review and approval activities are designed to coincide with project management reviews required by NPR 7120.5, e.g., PDR, CDR, & Pre-ship Review.
- Process and deliverable dates may be altered through advanced formal agreement between the Payload Project Office and the PSWG provided that safe processing, project schedule, and safety review input to Key Decision Points (as defined in NPR 7120.5) are not impacted.

A Payload Safety Introduction (PSI) Briefing

- SCHEDULE PSI as early as possible but no later than midpoint of the Preliminary Design Phase. First meeting of the PSWG (Concept Briefing).
- Payload project submittals:
  - As a precursor to the tailoring processes, identification of the safety requirement documents that are applicable to the project; previously approved waivers and alternative approaches, and known tailoring issues
  - Draft Systems Safety Plan providing a conceptual overview of the Systems Safety Program
  - Identification of known spacecraft systems and a preliminary assessment of potential hazards documented in a preliminary hazard list
  - A basic Ground Operations Flow Overview providing the location and timeline of major payload activities and tasks
- The information provided should be as complete as the technical maturity of the conceptual design and operations allow
- Sometimes a Technical Interchange Meeting (TIM) with PSWG members (to date) and project system engineers is necessary prior to the PSI if known hazardous systems are being discussed/designed prior to holding the PSI.

Safety Review I

- SCHEDULE: Begins prior to PDR & completed ≤ 60 days after PDR or as necessary ensuring PSWG's timely input to Key Decision Point C
- PSWG meeting in conjunction with PDR
- Payload project Safety Review I submittals due ≥ 30 days prior to the PDR meeting:
  - Final System Safety Plan
  - Tailored Payload Safety Requirements
  - Safety Data Package I
- PSWG shall:
  - Approve the final System Safety Plan
  - Discuss comments of Safety Data package I
  - Discuss the Tailored Payload Safety Requirements
  - Assess Preliminary Hazard Analysis and any Hazard Reports
  - Address any safety issues from PDR

Safety Review I (cont)

- The PSWG Chairperson shall provide the Payload Project Manager with:
  - Status of Safety Review I including any safety concerns following the PDR meeting
  - Assessment of the project's safety efforts and identification of any safety concerns to support the project's Key Decision Point C

Safety Review II

- SCHEDULE: Begins prior to CDR & completed ≤ 60 days after CDR or as necessary ensuring PSWG's timely input to Key Decision Point D
- PSWG meeting in conjunction with CDR
- Payload project submittal items due ≥ 30 days prior to the CDR meeting:
  - Safety Data Package II
  - Final Tailored Payload Safety Requirements
- Payload project submittal items due at CDR:
  - Safety Action Tracking Log for review and concurrence to close completed actions

Safety Review II (cont)

- PSWG shall:
  - Discuss comments of Safety Data Package II
  - Address any safety issues from CDR
  - Review the project for any changes to the design, processing, or interfaces for new or increased hazards or safety issues
- The PSWG Chairperson provides the Payload Project Manager with:
  - Status of Safety Review II including any safety concerns following the CDR meeting
  - Assessment of the project's safety efforts and identification of any safety concerns to support the project's Key Decision Point D

Safety Review III

- SCHEDULE: Begins with data submittal & completed at a PSWG meeting held ≥ 5 business days prior to Launch Services Program's Ground Operations Review
- Payload project submittals:
  - Safety Data Package III
    - Due ≥ 60 days prior to Safety Review III
    - Finalized ≥ 30 days before hardware shipment to processing site
  - Safety Action Tracking Log
  - Safety Verification Tracking Log
  - Certificate of ELV Payload Safety Compliance
- PSWG verifies that all safety requirements have been satisfied or will be satisfied and waivers have been approved

Safety Review III (cont)

- The PSWG Chairperson and the ELV Payload Safety Manager shall sign the Certificate of ELV Payload Safety Compliance indicating that the project has safety approval to ship to the launch area
- The ELV Payload Safety Manager shall provide the Payload Project Manager with a letter ≤ 5 days after successful completion of Safety Review III. The letter shall:
  - Indicate that the project has successfully completed the payload safety review process per this NPR
  - Include a copy of the signed Certificate of ELV Payload Safety Compliance
  - Identify any conditions or constraints applicable to the safety approvals

ELV Payload Safety Certificate of Safety Compliance

A. Payload Mission: _____

B. Launch Vehicle: _____

C. The Payload Project Office hereby certifies that the payload complies with all applicable requirements of NPR 8715.7, Expendable Launch Vehicle Payload Safety Program.

D. Approved Waivers: _____

E. Payload Project Manager Signature for Approval: _____
Date: _____

F. Payload Safety Working Group (PSWG) Concurrence:

The PSWG Members concur that the necessary payload safety requirements of NPR 8715.7 and those safety requirements related to their areas of responsibility and authority are being or are planned to be satisfactorily accomplished thus completing the NPR 8715.7 safety and approval process performed by the project's PSWG. From this point forward, payload processing safety issues shall be worked with the appropriate safety authority and need not be worked as a group under the PSWG. All compliance of safety requirements that are pending successful completion of in-line work required to support and complete this mission must be documented on the Safety Verification Tracking Log and attached. All in-line working level safety processes, procedures and requirements necessary for safe launch processing and a safe successful mission shall be followed as directed by the local safety authorities.

1) NASA Payload Safety Working Group (PSWG)

Chairperson: _____ Date: _____

USAF Safety: _____ Date: _____

Project Safety Engineer: _____ Date: _____

G. Pending conditions, actions, or constraints

H. The ELV Payload Safety Manager hereby concurs that the processes and requirements of NPR 8715.7, Expendable Launch Vehicle Payload Safety Program have been or are planned to be met.

NASA ELV Payload Safety Manager: _____

Date: _____

Tailoring Process

- Purpose: Ensure oversight of Agency requirements and provide Centers and Project Managers with the authority and flexibility to complete their tasks.
- Definition: The process of assessing the applicability of requirements and evaluating potential compliance to generate a set of specific requirements for the project.
- The Payload Project Office & its system safety engineer work with the PSWG to identify applicable requirements
- The PSWG Chairperson and Agency Team ensure consistency
- The PSWG Chairperson and the ELV Payload Safety Manager ensure appropriate authorities approve (sign) each tailored document. At a minimum, these include the Payload Project Manager, SMA Technical Authorities (project and ELV Launch) and Air Force Range Safety.

Tailoring Process (cont)

- After approval: Any changes are to be made by the Payload Project, presented to the signatories and approval/concurrence/signature by the original authorities will be required
- If tailoring results in an increased safety risk, the Payload Project shall prepare a ELV Payload Safety Program ELS/Waiver request (available on ELV Payload Safety website)
  - *An approach that differs from the stated requirement may be approved as part of tailoring if there is no increased safety risk & sufficient rationale is given*
- If there is non-concurrence and resolution through coordination with the PSWG, the Agency Team, or the SMA Technical Authorities cannot be reached, the ELV Payload Safety Program Manager shall brief OSMA to identify the best approach to achieve resolution
- Tailoring Instructions found in NEPRSR Volume 1 Attachment 1

Noncompliance (ELS/Waiver) Process (cont)

- In addition to satisfying NPR 8715.3, the signatories of each waiver shall include:
  - Payload Project Manager
  - Responsible NASA SMA Technical Authorities
  - All other authorities involved or responsible for issues addressed in the waiver
- The Agency Team coordinates with the PSWG Chairperson to ensure a consistent waiver approach
- If a required signatory does not concur and resolution through coordination with the PSWG, the Agency Team, or the SMA Technical Authorities cannot be reached, all interested parties shall brief OSMA to identify the best approach to achieve resolution

NASA ELV Payload Safety ELS/Waiver Request

- ELS' during the NEPRSR tailoring process do not require a NASA ELS/Waiver Request Form
- ELS' proposed after the tailored NEPRSR has been signed require a NASA ELS/Waiver Request Form
- When a requirement cannot be met (not deemed an ELS) it is considered a waiver and requires a NASA ELS/Waiver Request Form

1. Request Type: ☐ Equivalent Level of Safety (ELS) ☐ Waiver	**NASA ELV PAYLOAD SAFETY ELS/WAIVER REQUEST**	Control Number Other Authority Tracking #:

2. Date of Request	3. Duration:
4. Requesting Organization:	5. Location(s) Where the Request Applies:
6. Safety Requirements Document and Paragraph:	7. NASA Program (Select All Applicable) ☐ Launch Services Program (ELV) ☐ Institutional ☐ Other (specify) _____
8. Specify Mission/Project:	9. Does this Request affect personnel safety? ☐ Yes ☐ No (If yes, see directions)
10. Does this Request affect public safety? ☐ Yes ☐ No (If yes, see directions)	11. Is a Federal, State, or local regulation being violated? ☐ Yes ☐ No (If yes, see directions)

12. Describe the requirement(s) and the specifics of how it (they) would not be met if this Request is approved:

13. What other options or procedures were considered, and what was the rationale used to disposition/discard these options?

14. Have any design features or procedural controls been eliminated or compromised which would affect the safe operation of the system/operation?
☐ Yes ☐No

(If Yes, specify)

15. Does this Request affect any other ELS or waiver, agreement, software design or other hardware design or procedural consideration?
☐ Yes ☐ No

(If Yes specify)

16. What additional controls or measures are in place to minimize the risk to personnel, facilities, and flight equipment?

17. How has the number of people and amount of hardware exposed to the potential hazard been minimized?

Noncompliance (ELS/Waiver) Process Questions

1. When will a waiver be written
   a. during the NEPRSR tailoring process
   b. after the tailored NEPRSR has been signed
2. What is the difference between a waiver and an ELS?
   a. ELS is equivalent level of safety
   b. Waiver is a non compliance
   c. a. and c.
   d. ELS happens after tailoring and waiver occurs during tailoring
3. True or False: a noncompliance is a noticeable or marked departure from requirements, standards, or procedures; includes equivalent level of safety determinations (formerly meets intent certifications), and waivers.

Hazard Reports

- Purpose: Utilize system safety engineering and analyses to identify and document potential hazards and verification for how those hazards will be eliminated or controlled
- At the Payload Safety Introduction Briefing, they will reflect the conceptual design, planned interfaces, operations, and identify potential hazards
- Hazard Reports will identify:
  - The hazard and mechanism for occurrence and resulting outcome
  - The worst case severity and probability, mitigations, and severity and probability with mitigations in-place
- Hazard Reports are included in each Safety Data Package

NASA ELV Payload Safety Hazard Report

1. Hazard Report Number:		2. Status of Report: Date:
3. Revision: Date: Originator Name: Phone: Email:		4. Facility (Check all that apply): ☐ Testing ☐ Launch Pad ☐ Processing ☐ Transport to Pad
5. Mission/Payload:		6. Hazard Group:
7. System/Subsystem	8. Hazard Description:	
9. Requirement(s):		10. Risk: Initial Impact / Initial Probability — Final Impact / Final Probability
11. Project Manager:		12. PSWG Chair:

13. Hazard Causes	14. Hazard Controls	15. Safety Verification Methods	16. Facility	17. Status of Verification

Once the payload is shipped

- After transportation to the launch area processing facility, the project shall:
  - Update the Safety Verification Tracking Log at least weekly (more frequently if needed to remove operational constraints)
  - Ensure the current Safety Verification Tracking Log is available
  - Ensure Technical Operating Procedures are approved 10 days prior to use

Questions

1. Why do we tailor the NEPRSR?
   a. Ensure oversight of Agency requirements
   b. To change requirements to accommodate the project's design and put in what they would like
   c. To provide the ELV Program Manager with the authority and flexibility on payload design
2. True or False: NEPRSR stands for NASA ELV Payload Range Safety Requirements
3. True or False: The NEPRSR gives NASA total control over the ELV Payload Safety Process

Questions & Contacts

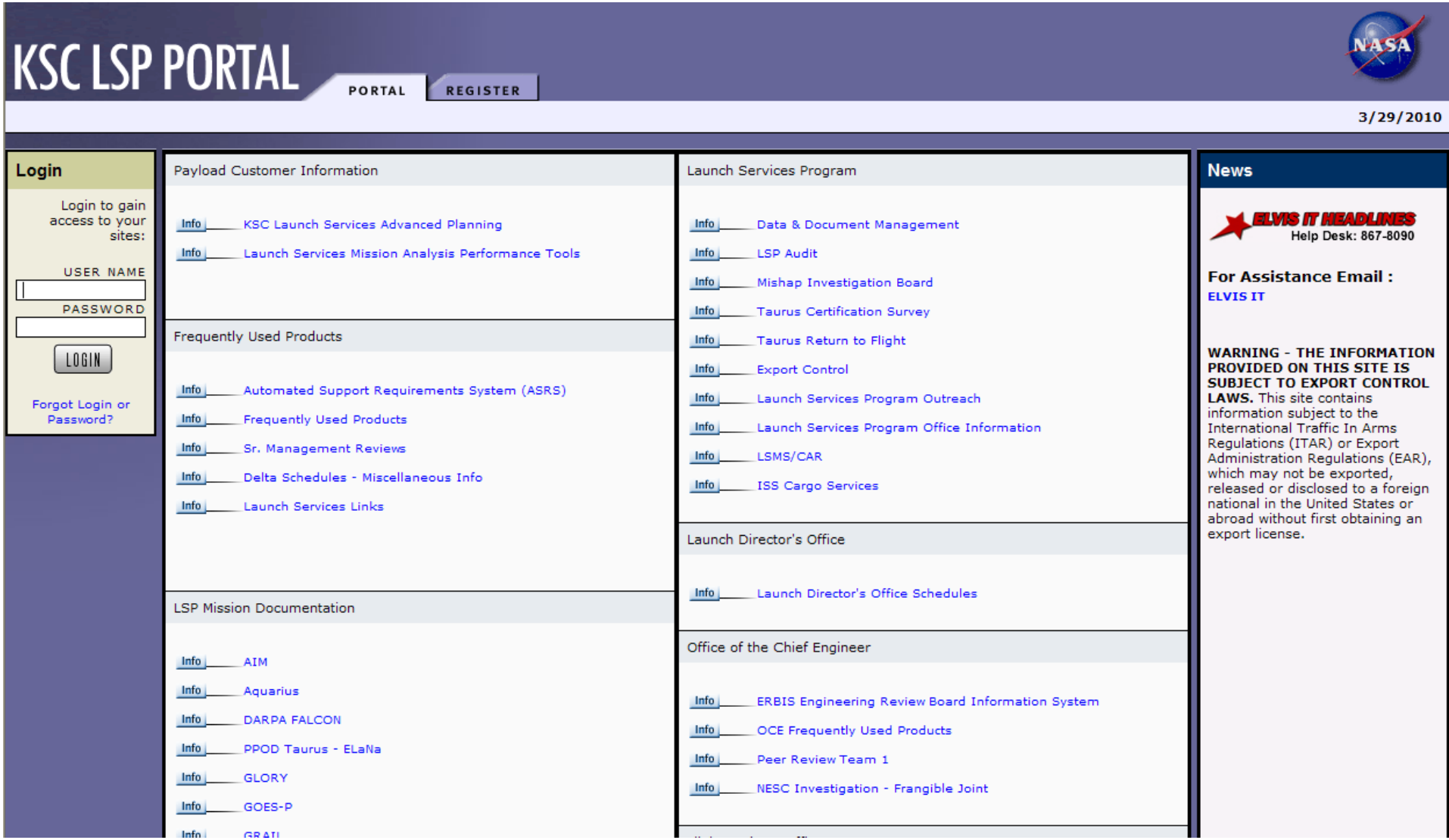
- Cal Staubus, ELV Payload Safety Manager
  - Work: 321-867-8757
  - Cell: 321-213-0348
  - calvert.a.staubus@nasa.gov

- Jennifer Holland, Senior Safety Engineer, ManTech SRS
  - Work: 321-867-9723
  - jennifer.a.holland@nasa.gov

Background/Reference Charts

LSP Portal

https://elvprogram.ksc.nasa.gov/



LSP Portal

Info STSS Demo
Info TDRS K & L
Info WISE
Info (Archive) Historical Missions

LSP Exploration Documentation

Info Heavy Lift Launch Study
Info IR&D
Info JIMO

Launch Site Operations Division

Info Launch Services Launch Site Integration

ELVIS Contractor

Info ELVIS Contract
Info ELVIS Emergency Evacuation Plans

Info MIRS
Info Secondary Payloads
Info Telemetry Projects

Launch Services SMA Division

Info ELV Payload Safety Mission Documentation
Info MANTIS
Info NASA S&MA
Info S&MA Schedules
Info S&MA Watch Items

Launch Services Fleet and Systems Management

Info Avionics Branch
Info ULA Transition
Info Fleet and Systems Management Division
Info Mission Integration Branch
Info Fleet Systems Integration Branch
Info Fleet Field Offices
Info LSP Fluids & Propulsion Branch
Info Mechanical Systems Branch
Info Electrical Systems Branch
Info Vehicle Engineering Historical Data

Flight Analysis Division

Info Flight Analysis Division

KSC
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LSP Portal

To satisfy requirements set forth in NPR 8715.7 Expendable Launch Vehicle Payload Safety Program, all of the ELV Payload Safety Mission documentation shall be kept in a single area on the LSP Portal. This documentation shall include the following:

ELVPSMD - GRAIL
ELVPSMD - LDCM
ELVPSMD - MMS
ELVPSMD - NUSTAR
ELVPSMD - RBSP
ELVPSMD-TDRS-K
ELVPSMD - IRIS
ELVPSMD - MAVEN
ELVPSMD-GOES-R
ELVPSMD - In Work

Administrative Documentation:
Meeting Notices
Deliverable Deposit Notifications
Meeting Schedule (Section 2.3.5.a.)
Calendar
Key Issues (Section 2.3.5.g.)
Decisions (Section 2.3.5.g.)
Overall project status (Section 2.3.5.g.)

Payload Safety Introduction Meeting Documentation:
Meeting Minutes and Final Meeting Minutes (Section 2.3.4.g.)
Comments on Deliverables (Section 2.3.5.b)
Consolidated Comments on Deliverables
Action Item Tracker
Draft Tailored Payload Safety Requirements (Section 2.4.3.a)
Draft Systems Safety Program Plan (Section 2.4.3.a)
Preliminary Hazard List (Section 2.4.3.a)
Ground Operations Flow Overview (Section 2.4.3.a)

Phase I Safety Review Documentation:
Meeting Minutes and Final Meeting Minutes (Section 2.3.4.g.)
Comments on Deliverables (Section 2.3.5.b)
Consolidated Comments on Deliverables
Action Item Tracker
Draft Tailored Payload Safety Requirements (Section 2.4.3.b)
Final System Safety Program Plan (Section 2.4.3.b)
Preliminary Hazard Reports (Section 2.4.3.b)
Ground Operations Flow Overview (Section 2.4.3.b)
Phase I (Preliminary) Safety Data Package (Section 2.4.3.b)
Draft of the PDR Safety Presentation (Section 2.4.3.b)

Phase II Safety Review Documentation:
Meeting Minutes and Final Meeting Minutes (Section 2.3.4.g.)
Comments on Deliverables (Section 2.3.5.b)
Consolidated Comments on Deliverables
Action Item Tracker
Final Tailored Payload Safety Requirements (Section 2.4.3.c)
Draft Ground Operations Plan (Section 2.4.3.c)
Updated Hazard Reports (Section 2.4.3.c)
Ground Operations Flow Overview (Section 2.4.3.c)
Phase II (Draft) Safety Data Package (Section 2.4.3.c)
Draft of the CDR Safety Presentation (Section 2.4.3.c)
Safety Actions Tracking Log (Section 2.4.3.c)

Phase III Safety Review Documentation:
Meeting Minutes and Final Meeting Minutes (Section 2.3.4.g.)
Comments on Deliverables (Section 2.3.5.b)

LSP Portal

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Home Meetings PSIB Safety Data Packages SATL/SVTL Safety Non-Compliances Schedule
Curator: Coleen Taylor
NASA Official: Judy Gari
Date Last Modified: 11/9/2009

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PSIB

GRAIL Payload Safety Introduction Briefing.msg
GRAIL PSI Briefing Agenda.ppt
GRAIL PSI Briefing FINAL.ppt
PSIB Attendance Sheet.pdf
GRAIL PSIB 09092008 Minutes.doc

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